

Science Curriculum Summary

Science stimulates and excites the curiosity of pupils about phenomena and events in the world around them. It satisfies a need for knowledge while empowering them with the skills to take on new situations methodically and scientifically. Because Science links direct practical experience with ideas, it can engage learners at many different levels. The scientific method is about developing and evaluating explanations through experimental evidence and modelling. This is a spur to creative and critical thought. Through Science, pupils understand how major scientific ideas contribute to technological change, industry, business, medicine and education, thus impacting on the quality of life on Earth and beyond.

Here at St. John's, we aim to stimulate interest and enthusiasm for Science through engaging learning and topical interest. Indeed, the whole concept of our paperless department captures the current mood of our ever-evolving scientific world.

Our programme of study comprises four areas; scientific enquiry, life processes and living things, materials and their properties, and physical processes. All presented under the global banner *Working Scientifically* using the latest technology.

Teaching methods include class discussion, individual research, practical experiments and investigations, problem solving exercises, fieldwork, model-making and group work. Many of the topics are planned alongside the DT and ICT department and are delivered as STEM units. Pupils are encouraged to write up their work using good English and with correct spelling of important scientific terms. Facts are presented in concise note form, supported by charts, tables, diagrams and graphs where applicable.

But it is the development of scientific skills and our engagement with the evolution of Science that are most celebrated.

Skills and Content

Pre-prep The content of teaching in the pre-prep depends on the interests and prior knowledge of the children. Topics will change depending on what each cohort of children brings to the class.

Kindergarten (KG)

Skills

- Compare similarities and differences in relation to places, objects, materials and living things.
- Talk about the features of their own immediate environment and how environments might vary from one another.
- Make observations of animals and plants and explain why some things occur
- Talk about changes.

Transition 1 (T1)

Skills

- Question and find answers by using first-hand experience and simple information sources
- Begin to understand what a fair test involves and to predict and draw simple conclusions
- Be able to collect evidence by making observations and measurements when trying to answer a question
- Review work and explain it to others
- Use simple scientific vocabulary

Topics may include

- Materials
- Plants
- Temperature
- Changes
- Life cycles
- Water cycle
- Displacement theory
- Flight

Transition 2 (T2)

Skills

- Initiate their own investigations and to predict what might happen before deciding what to do
- Select their own resources giving reasons for their choice and compare their results with their predictions
- Communicate what happened in an experiment in a variety of ways
- Make comparisons and identify simple patterns or associations
- Predict what might happen in an experiment
- Begin to understand what makes a fair test
- Use grouping and sorting to find out about the world
- Make observations

Topics may include

- Forces
- Variation
- Grouping and changing
- Habitats
- Materials
- In the summer term, the children choose their own topic for study and scientific skills are taught through this area of their interest.

Form 1

Skills

- Plan and carry out a fair test
- Observe, measure and record data
- Explain their ideas
-

Topics

- Light and shadow
- Earth, Sun and Moon
- Magnetism
- Forces
- Minerals, rocks and fossils
- Habitats, variation, classification and grouping

Form 2 (as STEM)

Form 2 Science skills are being taught through STEM lessons, in which Science, technology and computing are taught in a cross-curricular way.

Key topics and skills include

- Forces including bridge model construction and testing
- Lighthouse model planning, programming and constructing
- Soil, plant growth and nutrition, including observation and testing for starch
 - The Science of flight including investigating aerodynamics
 - Learning to plan and carry out a fair test including the use of investigation variables
 - Data collection including learning techniques of surveying and sampling

Topics:

- Orientation.
- Structures and bridge design challenge.
- Lighthouse research and design
- Seed germination investigation.
- Flight.
- Data collection and analysis
- Forces investigations

Form 3

Skills

- Think creatively to explain how living and non-living things work and to establish links between causes and effects
- Think about and plan when trying to find answers to questions, considering what might happen before trying out
- Choose appropriate equipment and methods
- Carry out fair tests or comparisons by changing one factor and observing or measuring the effect while keeping other factors the same
- Consider the dependent, independent and control variables when planning investigations

Topics

- Electricity
- Teeth and healthy eating
- Hearing and seeing
- Adaptations and habitats
- Plant growth and reproduction
- Insulators

Form 4

Skills

- Manipulate simple laboratory equipment safely, following written and verbal instructions
- Make predictions, accurate observations and measurements
- Record, interpret and explain through carrying out a range of experiments and investigations
- Manipulate more than one variable, carry out a fair test, and deduce and reason from information and data
- Apply, assimilate and recall information
- Make use of mathematical procedures to manipulate data

Topics

- Particles
- Classification
- Electricity and Magnetism
- Elements and Compounds
- Space
- Chemical Reactions
- Reproduction
- Keeping Healthy

Form 5 - 6

Skills

- Calculate percentages, manipulate formulae and draw and interpret graphs
- Record data using data loggers
- Perform statistical analysis using spreadsheets
- Plan, carry out and evaluated fair tests
- Assess risk and work safely in the laboratory

Topics

- Human biology
- Cells
- Metal Reactions
- Forces
- Acid Reactions
- Light and Sound
- Energy
- Variation
- Carbon Chemistry

Contribution to Spiritual, Moral, Social and Cultural Education

Science develops SMSC in a wide variety of ways, including:

- Developing a sense of wonder in the natural world
- Learning about the contributions of scientists from around the world to Science
- Developing children's ability to observe and interpret
- Supporting children to work collaboratively
- Developing children's ability to find creative and imaginative solutions to problems and questions
- Giving children opportunities to ask and explore questions about the world
- Understanding the role of Science in helping different communities and individuals
- Giving scientific understanding that will help children to make informed decisions about moral, social and cultural questions